PUBLIC HEALTH ASSESSMENT

STAR LAKE CANAL

PORT NECHES, JEFFERSON COUNTY, TEXAS

CERCLIS NO. TX0 001414341

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Prepared by

Texas Department of Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

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INTRODUCTION

The Agency for Toxic Substances and Disease Registry (ATSDR) was established under the mandate of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. This act, also known as the "Superfund" law, authorized the U.S. Environmental Protection Agency (EPA) to conduct clean-up activities at hazardous waste sites. EPA was directed to compile a list of sites considered hazardous to public health. This list is termed the National Priorities List (NPL). The 1986 Superfund Amendments and Reauthorization Act (SARA) directed ATSDR to prepare a Public Health Assessment (PHA) for each NPL site.

In conducting the PHA, three types of information are used: environmental data, community health concerns, and health outcome data. The environmental data are reviewed to determine whether people in the community might be exposed to hazardous materials from the NPL facility. If people are being exposed to these chemicals, ATSDR will determine whether the exposure is at levels which might cause harm. Community health concerns are collected to determine whether health concerns expressed by community members could be related to exposure to chemicals released from the NPL facility. If the community raises concerns about specific diseases in the community, health outcome data (information from state and local databases or health care providers) can be used to address the community concerns. Also, if ATSDR finds that harmful exposures have occurred, health outcome data can be used to determine if illnesses are occurring which could be associated with the hazardous chemicals released from the NPL facility.

In accordance with the Interagency Cooperative Agreement between ATSDR and the Texas Department of Health (TDH), ATSDR and TDH have prepared this PHA for the Star Lake Canal NPL site. This PHA presents conclusions about whether exposures are occurring, and whether a health threat is present. In some cases, it is possible to determine whether exposures occurred in the past; however, often a lack of appropriate historical data makes it difficult to quantify past exposures. If it is found that a threat to public health exists, recommendations are made to stop or reduce the threat to public health.

SUMMARY

The Star Lake Canal site is located in Port Neches, Jefferson County, Texas, an industrial city adjacent to the Neches River in southeast Texas. The site includes Star Lake Canal, the adjoining Molasses Bayou, and Jefferson Canal. Star Lake Canal is a man-made canal that was dug more than fifty years ago for the purpose of wastewater discharge into the Neches River by local petrochemical facilities. Star Lake Canal is approximately three miles long, up to 20 feet deep, and 100 feet wide. It is surrounded by marsh and wetlands with a variety of species of birds and animals, several of which are endangered. Star Lake Canal is not used as a fishery or for recreational purposes; however, surface water from the canal empties into the Neches River, which is heavily used for fishing and recreational purposes.

The Texas Department of Health (TDH) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR) reviewed available environmental information for the site and evaluated the primary potential exposure pathways. These exposure pathways include fish consumption, drinking water and potential contact with contaminants in sediment and surface water from the canals. Based on available information, we have concluded that, at present, Star Lake Canal does not pose a public health hazard. A brief review of the exposure pathways that were considered is presented below.

Sediment Exposure Pathway

Sediment samples collected from Star Lake Canal, Molasses Bayou, and Jefferson Canal indicate that the sediment is contaminated with low levels of semi-volatile organic compounds. Only napthalene and benzo[a]pyrene were found at elevated levels. Background sediment samples taken from the Neches River indicate that contaminants have not migrated from Star Lake Canal.

The contaminated sediment in Star Lake Canal was collected approximately twenty feet below the water surface. Sediment from Molasses Bayou was collected from shallow marshlands and sediment from Jefferson Canal was collected from its concrete lined ditch. We have concluded that contaminants in the sediment do not pose a public health hazard because there is sufficient evidence indicating that people would not be likely to come into contact with the sediment on a frequent basis. Thus, we do not consider dermal contact or incidental ingestion to be important potential routes of exposure.

Surface Water Pathway

Recreational purposes

Although surface water samples were not collected, available information indicates that Star Lake Canal is not used for recreational purposes such as swimming or wading. We have concluded that potential contaminants in surface water in and around Star Lake Canal do not pose a public health threat because there is sufficient evidence indicating that human exposures to this media have not occurred, are not occurring, and are not likely to occur in the future.

Fish Consumption Pathway

Although fish tissue samples from Star Lake Canal and Molasses Bayou have not been collected, evidence indicates that these areas are not used as fisheries. Jefferson Canal is too shallow to support fish. Based on available information we have concluded that fishing in and around Star Lake Canal does not pose a public health hazard because of sufficient evidence indicating that no human exposures are now occurring, and none are likely to occur in the future. Fish from the Neches River, a popular fishery downstream from Star Lake Canal, previously have been sampled by TDH and

were not contaminated with either semi-volatile or volatile organic chemicals. Thus, eating fish from the Neches River does not pose a public health hazard.

Ground Water Pathway

Drinking water

Drinking water in the area of the site is supplied by the Lower Neches Valley Authority whose surface water intake points are north and upstream of the area, in the City of Beaumont. There is no documentation indicating that wells in the vicinity of the canal have been contaminated by hazardous substances attributable to the canal. No public supply wells exist within a four mile radius of the canal. Within a one mile radius of the site, one irrigation well and one domestic well was identified. Both wells are hydrologically upgradient from the beginning of the canal [1]. We have concluded that drinking water from the area does not pose a public health hazard.

ATSDR PUBLIC HEALTH CONCLUSION CATEGORIES

CATEGORY A. URGENT PUBLIC HEALTH HAZARD [1]	CATEGORY B. PUBLIC HEALTH HAZARD [1]	CATEGORY C. INDETERMINATE PUBLIC HEALTH HAZARD	CATEGORY D. NO APPARENT PUBLIC HEALTH HAZARD [1]	CATEGORY E. NO PUBLIC HEALTH HAZARD
This category is used for sites where short-term exposures (<1 yr) to hazardous substances or conditions could result in adverse health effects that require rapid intervention.	This category is used for sites that pose a public health hazard due to the existence of long-term exposures (>1 yr) to hazardous substances or conditions that could result in adverse health effects.	This category is used for sites in which "critical" data are *insufficient* with regard to extent of exposure and/or toxicologic properties at estimated exposure levels.	This category is used for sites where human exposure to contaminated media may be occurring, may have occurred in the past, and/or may occur in the future, but the exposure is not expected to cause any adverse health effects.	This category is used for sites that, because of the absence of exposure, do NOT pose a public health hazard.
Criteria: Evaluation of available information[2] indicates that site-specific conditions or likely exposures have had, are having, or are likely to have in the future, an adverse impact on human health that requires immediate action or intervention. Such site-specific conditions or exposures may include the presence of serious physical or safety hazards, such as open mine shafts, poorly stored or maintained flammable/explosive substances, or medical devices which, upon rupture, could release radioactive materials.	**Criteria:** Evaluation of available relevant information[2] suggests that, under site-specific conditions of exposure, long-term exposures to site-specific contaminants (including radionuclides) have had, are having, or are likely to have in the future, an adverse impact on human health that requires one or more public health interventions. Such site-specific exposures may include the presence of serious physical hazards, such as open mine shafts, poorly stored or maintained flammable/explosive substances, or medical devices which, upon rupture, could release radioactive materials.	**Criteria:** The health assessor must determine, using professional judgement, the "criticality" of such data and the likelihood that the data can be obtained and will be obtained in a timely manner. Where some data are available, even limited data, the health assessor is encouraged to the extent possible to select other hazard categories and to support their decision with clear narrative that explains the limits of the data and the rationale for the decision.	**Criteria:** Evaluation of available information[2] indicates that, under site-specific conditions of exposure, exposures to site-specific contaminants in the past, present, or future are not likely to result in any adverse impact on human health.	**Criteria:** Sufficient evidence indicates that no human exposures to contaminated media have occurred, none are now occurring, and none are likely to occur in the future.

[1] This determination represents a professional judgement based on critical data which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.

[2] Such as environmental and demographic data; health outcome data; exposure data; community health concerns information; toxicologic, medical, and epidemiologic data.

BACKGROUND

Site Description and History

Star Lake Canal is located in Port Neches, Jefferson County, Texas, an industrial city adjacent to the Neches River in southeast Texas. The site includes Star Lake Canal, the adjoining Molasses Bayou, and Jefferson Canal (Fig. 1). Star Lake Canal is a man-made canal that was dug more than fifty years ago for the purpose of wastewater discharge into the Neches River by local petrochemical facilities. It is approximately three miles long, up to 20 feet deep, and 100 feet wide and eventually empties into the Neches River. Jefferson Canal is a small concrete lined drainage ditch in the upstream segment of Star Lake Canal between the industrial discharge area and the canal. Molasses Bayou winds adjacent to Star Lake Canal on the southeast side and is surrounded by wetlands (Figs. 2-7). Star Lake Canal is bordered to the south by a large industrial area, to the east by a few residences (separated by wetlands), to the west by wetlands, and to the north by the Neches River and Sabine Lake.

A sampling inspection by the Texas Department of Water Resources conducted in 1983 documented elevated levels of numerous semi-volatile organic compounds in material dredged from the banks of Jefferson Canal [1]. In 1996 and 1998, the Texas Natural Resource Conservation Commission (TNRCC) collected sediment samples from Jefferson Canal, Star Lake Canal, and the wetlands bordering Molasses Bayou. These samples were analyzed for volatile and semi-volatile organic contaminants, metals, polychlorinated biphenyls (PCBs), metals and pesticides. TNRCC found elevated levels of volatile and semi-volatile organic contaminants in sediments that extended more than two miles covering portions of Jefferson Canal, Star Lake Canal, and Molasses Bayou up to an area within one quarter-mile of where Molasses Bayou, Star Lake Canal, and the Neches River converge (Fig.1). Several samples contained metals, pesticides, and/or PCBs at levels above background.

The site, which contains more than three miles of wetlands that are habitat used by the white-faced ibis, a State-designated threatened species, was proposed to the Environmental Protection Agency's (EPA's) National Priority List (NPL) in July of 1999. The NPL is a list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund [2].

Site Visit

We toured the area in September 1999 with personnel from TNRCC, Lower Neches Valley Authority, and ATSDR using air boats provided by the Texas General Land Office. During our tour we did not see any evidence of fishing or crabbing in Star Lake Canal or the adjoining Molasses Bayou. Local residents confirmed that these areas were not used for fishing but did indicate that some fishers catch bait from these areas. Jefferson Canal did not appear to be deep enough to support fish and we did not see any evidence that people had been fishing from the Canal. Although Star Lake Canal is not used as a fishery or for recreational purposes, water from the canal empties into the Neches River which is heavily used for fishing and recreation. Surface water flows down the Neches River approximately 3 and one-half miles to Sabine Lake. Sabine Lake is used as a fishery and produced more than one million pounds of fish and shellfish in 1996.

While touring the site we did not notice any obvious chemical odors in the canals. Nor did we see any type of chemical sheen on the surface of the water. We did notice a sheen on the end of the pole that we were using to divert the boat away from vegetation. We also saw commercial crab traps and recreational fishers near the mouth of the Neches River and Star Lake Canal.

Demographics

The 1990 U.S. Bureau of Census data reports that there are 84 housing units and 218 people living within a one-half mile radius of the Star Lake Canal site [3]. The population consists of 215 whites, and 3 of "other races". There are 24 children aged 6 and younger, 25 adults aged 65 and older, and 42 females aged 15-44 (Fig. 8).

The closest cities in the vicinity are the City of Port Neches with a population of 12,974, the City of Port Arthur with a population of 58,724, and the City of Groves with a population of 16,513.

Community Health Concerns

To collect community health concerns, we mailed letters to residents living along Sara Jane Road adjacent to Star Lake Canal. The letters explained that we were evaluating sediment data in order to determine whether chemicals in the sediment pose a public health threat. We asked if they had any concerns pertaining to the site and asked them to respond by phone or mail. We received two responses, both of which stated that they had no health concerns related to the chemicals in Star Lake Canal.

One resident did indicate that he had a well, near Star Lake Canal, that has been used as a drinking water supply for 30 years. We contacted the resident and were told that the quality of the water is good. The well is hydrologically upgradient from the canals and the resident refuses to use city water because of individual preference for the well water.

ENVIRONMENTAL CONTAMINATION

Introduction

In order to assess the potential public health significance of exposure to the contaminants found in these sediments, we compared the contaminant concentrations to health assessment comparison (HAC) values for both non-carcinogenic and carcinogenic endpoints. HAC values are media-specific contaminant concentrations that are used to screen contaminants for further evaluation. While exceeding a HAC value does not necessarily mean that a contaminant represents a public health threat, it does suggest that the contaminant warrants further consideration.

Non-cancer comparison values are called environmental media evaluation guides (EMEGs) or reference dose media evaluation guides (RMEGs) and are respectively based on ATSDR's minimal risk levels (MRLs) and EPA's reference doses (RfDs). MRLs and RfDs are estimates of daily human exposure to a contaminant that is unlikely to cause adverse non-cancer health effects over a lifetime. Cancer risk comparison values are called carcinogenic risk evaluation guides (CREGs) and are based on EPA's chemical specific cancer slope factors and an estimated excess lifetime cancer risk of one-in-one-million persons exposed for a lifetime. We used standard assumptions to calculate appropriate HAC values (4).

Contamination

Sampling Event I

In October of 1996, as part of the Site Screening Inspection Report, the TNRCC collected 19 sediment samples, including three background samples from the Neches River, three samples at the confluence of Star Lake Canal and the Neches River, eight samples from Star Lake Canal, one sample from Jefferson Canal, two samples from Molasses Bayou, and two field duplicates. These samples were collected to assess sediment contamination via transport along the surface water pathway. The samples were analyzed for volatile and semi-volatile organic compounds, PCBs, pesticides, and metals. All samples were collected according to EPA-approved Quality Assurance Project Plans and the sample locations were approved by the EPA prior to sample collection [1].

Only three of the nineteen samples (SE-10, SE-11, SE-16) were found to contain organic contaminants (all semi-volatile) above detection limits (Table 1). Two of the three samples (SE-10, SE-11) were collected from Molasses Bayou and one of the three (SE-16) was collected from Jefferson Canal. None of the contaminants were found above their respective HAC values. None of the samples taken from the Neches River or from Star Lake Canal contained organic contaminants above detection limits. Although several metals were found at levels above background (arsenic, manganese, barium, chromium, and copper), none were found to exceed HAC values. PCBs and pesticides were not found in this sample set [1].

Table 1. Organic contaminants found in sediment from Star Lake Canal, Jefferson Canal and Molasses Bayou during the TNRCC Screening Site Inspection
(n=19 samples collected 1996)

	Molasses Bayou (near Star Lake) (SE-10)	Molasses Bayou (SE-11)	Jefferson Canal (SE-16)	Health Based Comparison Value (mg/kg)
napthalene	nd	210	nd	1,000 child/10,000adult EMEG
2-methylnapthalene	2.3	84	nd	none

acenapthene	2.7	70	14	3,000 child/40,000 adult RMEG
fluorene	1.5	61	18	2,000 child/30,000 adult RMEG
phenanthrene	2.7	nd	55	None
pyrene	1.4	48	22	2,000 child/20,000 adult RMEG
acenapthylene	nd	nd	12	none
anthracene	nd	nd	11	20,000 child/200,000 adult RMEG
fluoranthene	nd	nd	12	2,000 child/30,000 adult RMEG

*RMEG=reference dose media evaluation guide and is based on EPA's RfD, EMEG=environmental media evaluation guide and is based on ATSDRs MRL, CREG=cancer risk evaluation guide and is based on an excess cancer risk of one in one-million persons exposed over a lifetime. Health based comparison values are based on an assumed ingestion rate of 200 mg sediment for children (body weight 10 kg) and an ingestion rate of 100 mg sediment for adults (body weight 70 kg)

Sampling Event II

In March 1998, as a follow-up to the sampling conducted for the Screening Site Inspection Report, the TNRCC collected 10 samples from Jefferson Canal and 16 samples from Molasses Bayou (Tables 2 and 3). Sediment samples were collected between 0 and 30 inches in depth. The 10 sediment samples from Jefferson Canal were analyzed for volatile and semi-volatile organic compounds, pesticides, PCBs, and metals. The 16 sediment samples from Molasses Bayou were analyzed for volatile and semi-volatile organic compounds and metals.

Tables two and three list only those semi-volatile and volatile organic chemicals that were detected in the sediment samples collected in Jefferson Canal and Molasses Bayou. Most of the samples had non-detectable levels of the compounds analyzed. Two semi-volatile organic compounds, napthalene and benzo(a)pyrene were detected above their respective HAC values (Table 2). Although benzo(a)pyrene exceeded its CREG (cancer risk evaluation guide based on one in one-million persons exposed over a lifetime) in four samples, the detection limit (0.48 mg/kg) was higher than the HAC value.

In Jefferson Canal, very low levels of Aroclor 1254, heptachlor epoxide, and DDD were found in some samples. Additionally, several metals were found at levels above background (arsenic, manganese, barium, chromium, and copper). None of these contaminants exceed their respective HAC values and exposure to the reported levels would not be expected to result in adverse health effects. In the 16 sediment samples collected from Molasses Bayou, benzo(a)pyrene exceeded its CREG value in one sample.

Table 2. Contaminants found in sediment from Jefferson Canal
(n=10 samples collected 1998)

Chemical	No. samples with detectable levels	Concentration range (mg/kg)	Health Based Comparison Value (mg/kg)*
Volatile Organic Compounds (mg/kg)			
benzene	1	0.24	20 CREG
toluene	1	9.5	10,000 child/100,000 adult RMEG
ethylbenzene	4	0.045-32	5,000 child/70,000 adult RMEG
styrene	2	20-70	10,000 child/100,000 adult RMEG
xylenes (total)	2	21-28	none

Semi-volatile Organic Compounds (mg/kg)			
napthalene	3	22-4,300	**1,000 child****/10,000adult EMEG
benzo(a)pyrene	4	0.59-46	**0.1 CREG**
2-methylnapthalene	2	4.2-8.2	none
acenapthylene	5	1.8-10	none
acenapthene	4	0.76-9.8	3,000 child/40,000 adult RMEG
fluorene	2	5.1-6	2,000 child/30,000 adult RMEG
phenanthrene	3	1.7-18	none
anthracene	3	1.6-4.1	20,000 child/200,000 adult RMEG
fluoranthene	4	1.4-5.6	2,000 child/30,000 adult RMEG
pyrene	5	2.2-9.3	2,000 child/20,000 adult RMEG
benzo(a)anthracene	6	0.5-73	none
chrysene	5	0.6-87	none
benzo(b)fluoranthene	1	0.9	none
benzo(k)fluoranthene	2	1-22	none
indeno(1,2,3)pyrene	1	0.69	none
benzo(g,h,i)perylene	1	0.8	none

*RMEG=reference dose media evaluation guide and is based on EPA's RfD, EMEG=environmental media evaluation guide and is based on ATSDRs MRL, CREG=cancer risk evaluation guide and is based on an excess cancer risk of one in one-million persons exposed over a lifetime. Health based comparison values are based on an assumed ingestion rate of 200 mg sediment for children (body weight 10 kg) and an ingestion rate of 100 mg sediment for adults (body weight 70 kg)
**Bold font indicates exceedance of HAC value

Table 3. Contaminants found in sediment from Molasses Bayou
(n=16 samples collected 1998)

Chemical	No. samples with detectable levels	Concentration range (mg/kg)	Health Based Comparison Value (mg/kg)*
Volatile Organic Compounds (mg/kg)			
benzene	1	0.029	20 CREG
ethylbenzene	6	0.037-41	5,000 child/70,000 adult RMEG
xylenes (total)	7	0.034-28	none
Semi-volatile Organic Compounds (mg/kg)			
napthalene	2	1.9-94	1,000 child/10,000adult EMEG
benzo(a)pyrene	1	2.9	**0.1 CREG****
methylnapthalene	4	2.8-100	none
acenapthylene	4	0.84-19	none
acenapthene	3	3.7-43	3,000 child/40,000 adult RMEG

fluorene	5	3.7-76	2,000 child/30,000 adult RMEG
phenanthrene	3	47-190	none
anthracene	5	2.1-34	20,000 child/200,000 adult RMEG
fluoranthene	6	1-36	2,000 child/30,000 adult RMEG
pyrene	5	1.5-21	2,000 child/20,000 adult RMEG
benzo(a)anthracene	2	2.2-4.2	none
chrysene	1	0.75	none
benzo(b)fluoranthene	1	1.2	none
benzo(k)fluoranthene	1	1.4	none
indeno(1,2,3)pyrene	1	0.85	none
benzo(g,h,i)perylene	1	0.74	none

*RMEG=reference dose media evaluation guide and is based on EPA's RfD, EMEG=environmental media evaluation guide and is based on ATSDRs MRL, CREG=cancer risk evaluation guide and is based on an excess cancer risk of one in one-million persons exposed over a lifetime. Health based comparison values are based on an assumed ingestion rate of 200 mg sediment for children (body weight 10 kg) and an ingestion rate of 100 mg sediment for adults (body weight 70 kg)
**Bold font indicates exceedance of HAC value

PATHWAYS ANALYSIS / PUBLIC HEALTH IMPLICATIONS

Introduction

The presence of chemical contaminants in the environment does not always result in exposure to or contact with the chemicals by people. Since chemicals only have the potential to cause adverse health effects when people actually come into contact with them, it is exposure, or the contact that people have with the contaminants that drives the public health assessment process.

People may be exposed to chemicals in different ways; usually by breathing, eating, drinking, or coming into direct contact with a substance containing the contaminant. This section reviews available information to determine whether people in the community have been, currently are, or may in the future be exposed to contaminants associated with this site.

To determine whether people are exposed to contaminants associated with the site, we evaluate the environmental and human components that lead to human exposure. This analysis consists of evaluating the five elements of an exposure pathway: a source of contamination, transport through an environmental medium, a point of exposure, a route through which the contaminant can enter the body, and an exposed population. Exposure pathways can be complete, potential, or eliminated. For a person to be exposed to a contaminant, the exposure pathway must be complete. An exposure pathway is considered complete when all five elements in the pathway are present and exposure has occurred, is occurring, or will occur in the future. A potential pathway is missing at least one of the five elements and may be completed in the future. Eliminated pathways are missing one or more elements and will never be completed. Table 4 identifies the pathways that we identified for this site. The following discussion incorporates only those pathways which are relevant and important to the site.

Since exposure does not always result in adverse health effects, we also evaluate whether the exposure could be sufficient to pose a hazard to people in the community. The factors that influence whether exposure to a contaminant or contaminants could or would result in adverse health effects include; (1) the toxicologic properties of the contaminant; (2) how much of the contaminant the individual is exposed to; (3) how often and/or how long exposure is allowed to occur; (4) the manner in which the contaminant enters or contacts the body (breathing, eating, drinking, or skin/eye contact); and, (5) the number of contaminants to which an individual is exposed (combinations of contaminants). Once exposure occurs, characteristics such as age, sex, nutritional status, genetics, life style, and health status of the exposed individual influence how the individual absorbs, distributes, metabolizes, and excretes the contaminant.

Evaluation of Sediment Exposure Pathway

Sediment samples collected from Star Lake Canal, Molasses Bayou, and Jefferson Canal indicate that the sediment is contaminated with low levels of semi-volatile organic compounds. Only napthalene and benzo[a]pyrene were found to exceed HAC values. Background sediment samples taken from the Neches River indicate that contaminants have not migrated from Star Lake Canal.

The contaminated sediment is from Star Lake Canal is approximately twenty feet below the water surface. The contaminated sediment from Molasses Bayou is below marsh water wetlands and the contaminated sediment from Jefferson Canal was collected from shallow water from its concrete lined ditch. We have concluded that contaminants in the sediment do not pose a public health hazard because there is sufficient evidence indicating that people would not be likely to come into contact with the sediment on a frequent basis. Thus, we do not consider dermal contact or incidental ingestion to be important potential routes of exposure.

Evaluation of Surface Water Pathway

Recreational purposes

Although surface water samples were not collected, available information indicates that Star Lake Canal is not used for recreational purposes such as swimming or wading. We have concluded that potential contaminants in surface water in and around Star Lake Canal does not pose a public health threat because there is sufficient evidence indicating that human exposures to this media have not occurred, are not occurring, and are not likely to occur in the future.

Evaluation of Fish Consumption Pathway

Although fish tissue samples from Star Lake Canal and Molasses Bayou have not been collected, evidence indicates that these areas are not used as fisheries. Jefferson Canal is too shallow to support fish. Based on available information we have concluded that fishing in and around Star Lake Canal does not pose a public health hazard because sufficient evidence indicates that no human exposures are now occurring, and none are likely to occur in the future. Fish from the Neches River, a popular fishery downstream from Star Lake Canal, previously have been sampled by TDH and were not contaminated with either semi-volatile or volatile organic chemicals. Thus, eating fish from the Neches River does not pose a public health hazard [5].

Evaluation of Ground Water Pathway

Drinking water

Drinking water in the area of the site is supplied by the Lower Neches Valley Authority whose surface water intake points are north and upstream of the area, in the City of Beaumont. There is no documentation indicating that wells in the vicinity of the canal have been contaminated by hazardous

substances attributable to the canal. No public supply wells exist within a four mile radius of the canal. Within a one mile radius of the site, one irrigation well and one domestic well were identified. Both wells are hydrologically upgradient from the beginning of the canal [1]. We have concluded that drinking water from the area does not pose a public health hazard.

Table 4. Potential Exposure Pathways for Star Lake Canal

PATHWAY NAME	PRIMARY CONTAMINANTS OF CONCERN	EXPOSURE PATHWAY ELEMENTS					TIME	CONCLUSIONS
		SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION		
Potential Exposure Pathways								
Canal sediment	napthalene benzo(a)pyrene	wastewater discharge from local industry	sediment	on-site, swimming, wading	dermal, incidental ingestion	residents	past present future	no public health hazard; contaminated sediments are in marshlands and deeper waters; sufficient evidence indicates that people would not be likely to come in contact with sediment on a frequent basis
Surface water	unknown	wastewater discharge from local industry	surface water	swimming, wading	dermal, incidental ingestion	residents	past present future	no public health hazard; sufficient evidence indicates that residents do not use the canal for recreational purposes
Fish	unknown	wastewater discharge from local industry	fish	fish consumption	ingestion	fishers and their families	past present future	no public health hazard; sufficient evidence indicates that the canal and surrounding wetlands are not used for fishing, and available data indicate contaminants have not migrated to the Neches River (heavily used for fishing and crabbing)
Ground water	unknown	wastewater discharge from local industry	groundwater	drinking water	ingestion	residents	past present future	no public health hazard; drinking water is supplied by the City
				water wells	ingestion	residents	past present future	no public health hazard; all wells are upgradient of the site

Health Outcome Data

Health outcome data (HOD) record certain health conditions that occur in populations. These data can provide information on the general health of communities living near a hazardous waste site. It also can provide information on patterns of specified health conditions. Some examples of health outcome databases are tumor registries, birth defects registries, and vital statistics. Information from local hospitals, and other health care providers also may be used to investigate patterns of disease in a specific population. TDH and ATSDR look at appropriate and available health outcome data when there is a completed exposure pathway or community concern. Due to a lack of completed exposure pathways and no identified community concerns, a review of health outcome data was not required for this site.

ATSDR'S CHILD HEALTH INITIATIVE

TDH has prepared this consult under a Cooperative Agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). TDH has included the following information in accordance with the ATSDR's Child Health Initiative.

ATSDR's Child Health Initiative recognizes that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contamination of their water, soil, air, or food. Children are at greater risk than adults from certain kinds of exposures to hazardous substances emitted from waste sites and emergency events. They are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. They are shorter than adults, which means they breathe dust, soil, and heavy vapors close to the ground. Children also are smaller, resulting in higher doses of chemical exposure per body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. Most importantly, children depend completely on adults for risk identification and management decisions, housing decision, and access to medical care.

TDH evaluated the potential for children living in the vicinity of Star Lake Canal to be exposed to site contaminants at levels of health concern. Although one contaminant (napthalene) exceeds the health based comparison for a child, exposure to site contaminants is not occurring.

CONCLUSIONS

1. Sediment samples taken from Star Lake Canal are contaminated with semi-volatile organic chemicals; however none of the levels exceed health based comparison values. Although benzo[a]pyrene and napthalene exceeded health based comparison values, these contaminants were found in a concrete lined ditch and marshlands that are primarily inaccessible to the public, thus, exposure to the sediment is unlikely. We have concluded that contaminants in the sediment do not pose a public health hazard because there is sufficient evidence indicating that people would not be likely to come into contact with the sediment on a frequent basis. Thus, we do not consider dermal contact or incidental ingestion to be important potential routes of exposure.

2. There are no public wells within a four mile radius and the one private well in the vicinity is upgradient of the site.

3. The canals are not used as a fishery or for recreational purposes.

RECOMMENDATIONS

There are no recommendations for action in Star Lake Canal, Jefferson Canal, or Molasses Bayou.

REFERENCES

1. TNRCC, Texas Natural Resource Conservation Commission. Screening Site Inspection Report for Star Lake Canal, TX0001414341, Port Neches, Jefferson County, Texas. Prepared in cooperation with the U.S. EPA. Sept. 1999.

2. U.S. EPA, United States Environmental Protection Agency. National Priorities List (NPL). Star Lake Canal, Port Neches, Texas. July 1999.

3. U.S. Census Bureau. Census of the population. Demographic Statistics Source: 1990 U.S. Census. U.S. Government Printing Office, Washington, D.C., 1985.

4. ATSDR, Agency for Toxic Substances and Disease Registry. Public Health Assessment Guidance Manual. Lewis Publishers, 1992.

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Figure 1. **Star Lake Canal site and surrounding area**

Fig. 2. Mouth of Molasses Bayou (left) and Star Lake Canal (right)

Fig. 3. Wetlands surrounding Molasses Bayou

Fig. 4. Refineries in distance. Molasses Bayou (front)

Fig. 5. Site visit in air boat through Star Lake Canal

Fig. 6. Residential area in background adjacent to Molasses Bayou.

Fig. 7. Recreational fishing and barge in Neches River at mouth of Star Lake Canal.

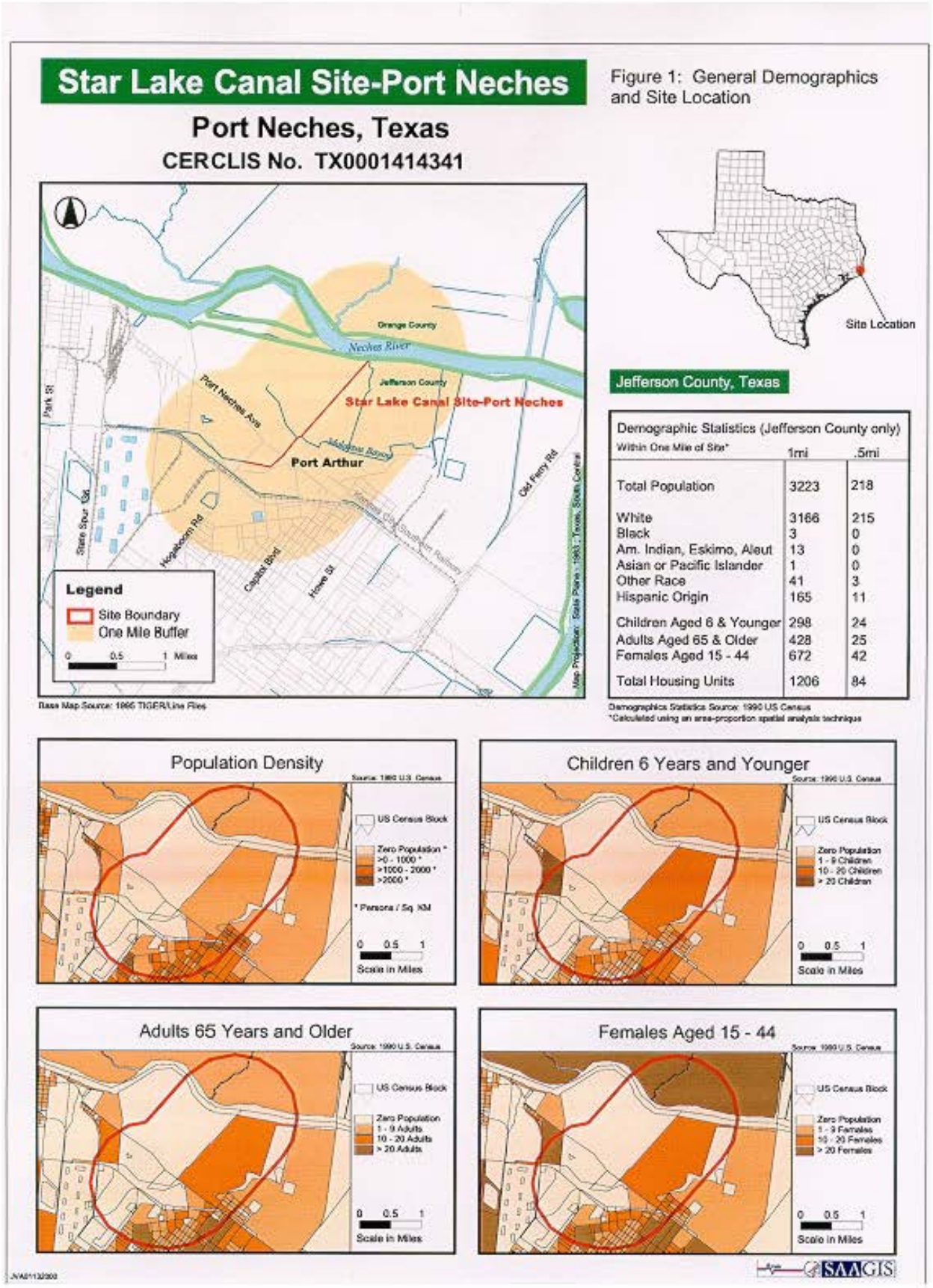

Figure 8 **Demographics for Star Lake Canal site**

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CERTIFICATION

This Public Health Assessment was prepared by the Texas Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the Public Health Assessment was initiated.

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The Division of Health Assessment and Consultation, ATSDR, has reviewed this Public Health Assessment and concurs with its findings.

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